

Harbour-front Enhancement Committee

**Shatin-to-Central Link (SCL)
Cross Harbour Section**

Purpose

This paper is to brief the Committee on the proposed works of the SCL Cross Harbour Section, in which reclamation will be required.

Background

2. The SCL is a new railway between Tai Wai and Admiralty with a total length of 17 km (see Annex 1). It is divided into two sections, namely Tai Wai to Hung Hom Section and Hung Hom to Admiralty Section. These will link up several major existing railway lines to form two strategic rail corridors (see Annex 2).

3. The Tai Wai to Hung Hom Section will extend the Ma On Shan Line from Tai Wai and connect to West Rail Line at Hung Hom, via Hin Keng, Diamond Hill, Kai Tak, To Kwa Wan, Ma Tau Wai and Ho Man Tin stations. Upon completion, the rail lines will be linked up to form the East West Corridor, and trains will run directly from Wu Kai Sha to Tuen Mun.

4. The Hung Hom to Admiralty Section will extend the East Rail Line to Exhibition and Admiralty stations on Hong Kong Island via the proposed Fourth Rail Harbour Crossing. This will form the North South Corridor, and trains from Lo Wu / Lok Ma Chau will run directly to Admiralty.

5. There are six interchange stations along SCL that allow passengers to interchange with other railway lines, enhancing the coverage of and the connectivity within the rail network.

6. In March 2008, the Government approved the further planning and design of the SCL. The Corporation has since been entrusted with its design and

construction. Preliminary design and site investigation works are in progress.

7. It is targeted to gazette the SCL by end 2009. The Tai Wai to Hung Hom Section will be completed in 2015. Owing to the interface with the major infrastructure projects at the north shore of Hong Kong Island, the Hung Hom to Admiralty Section will be completed in 2019.

SCL and the Harbour

8. There will be some harbour planning related issues arising from the implementation of the SCL:

- Construction of the SCL Cross Harbour Section (i.e. the section between the shorelines of Victoria Harbour) will require reclamation, most of which will be temporary in nature that it will be removed upon completion;
- Part of the SCL alignment on land will run close to the shore line. Some permanent structures, including ancillary buildings (e.g. ventilation shafts) and reprovisioned facilities will be built near the harbour-front;
- Temporary facilities will be required at the harbour-front during construction, e.g. barging points, concrete batching plants, works areas etc.

9. This paper focuses on the proposed reclamation for the Cross Harbour Section, and will form part of the consultation as required under the Protection of the Harbour Ordinance (PHO) (Cap. 531). The consultation will be a continuous process, and the Committee will be updated on the latest proposals as the project progresses.

10. Since the design development is on-going, consultation with the Committee on other above-mentioned elements of SCL that are related to harbour planning (i.e. permanent structures and temporary facilities at the harbour-front) will be conducted at a later stage.

Compliance with PHO

11. It has been found during current preliminary design that temporary reclamation will be required for the construction of the SCL Cross Harbour Section near the landfall at Hung Hom and at Causeway Bay Typhoon Shelter.

12. As stated in the Court of Final Appeal Judgment, the presumption against reclamation set by PHO can only be rebutted if an overriding public need for reclamation has been established. Moreover, it has to be proved that there is no reasonable alternative, and the proposed extent of reclamation does not go beyond the minimum of that which is required by the overriding need. These are detailed in the following paragraphs.

Overriding Public Need

13. The term “overriding public need” refers to the economic, environmental and social needs of the community and must be compelling and present. The following factors establish such overriding public needs for the SCL:

- Relieving congestion on the existing railway lines: The SCL will improve the railway network by providing new interchange stations and more route choices, helping to redistribute railway passenger flow to relieve congestion on existing railway lines, some of which (e.g. cross harbour section of the Tsuen Wan Line) will be over their desirable capacity in the near future.
- Supporting cross-boundary integration: The SCL’s direct and speedy rail service that connects the business centres in Hong Kong and Mainland China will have immense significance to support Hong Kong’s growing cross-boundary economic activities and social integration with Mainland China. Upon completion of the SCL, the journey time between Lo Wu and Admiralty Stations will be about 50 minutes only.
- Alleviating road-based traffic: The improved coverage of the railway network provided by the SCL will encourage more passengers to use the railway, thus reducing road-based traffic and relieving traffic congestion on Hong Kong Island and in Kowloon, especially at the Cross Harbour Tunnel.

- Mitigating deterioration of road-side air quality: Railway is a sustainable mode of transport and can reduce road-based traffic, helping to mitigate the deterioration of road-side air quality.

Benefits to the Community

14. The construction of the SCL is expected to bring about a number of social and economic benefits, including:

- Creation of 11,000 jobs during the construction period;
- Creation of commercial and tourism related employment opportunities along the SCL alignment;
- Passenger time savings that are worth HK\$4.1 billion per year by 2021; and
- Rejuvenation of old urban districts.

15. The construction schedule of the SCL will more or less coincide with that of the Central – Wan Chai Bypass (CWB) and other major planned projects along the north shore of Hong Kong Island. To minimize the disruption to the community, the SCL is proposed to coordinate with these interfacing projects.

Constraints

16. The choice of alignment for the Cross Harbour Section of the SCL are affected by a number of constraints:

- As the SCL has to extend the East Rail Line from Hung Hom towards Hong Kong Island as well as provide convenient interchange with existing rail network on both sides of the harbour, the Cross Harbour Section must connect Hung Hom Station (for interchange with East West Corridor) to Exhibition Station (for interchange with the future North Island Line).
- As constrained by the existing Hung Hom Station and neighbouring buildings, the new SCL platforms can only be located in the freight yard between the existing platforms and The Metropolis to avoid affecting the current East Rail and Intercity rail service and the foundation of The Metropolis .
- The alignment of the SCL Cross Harbour Section is constrained

by the existing and planned infrastructure facilities and buildings, including the Cross Harbour Tunnel (CHT), Central – Wan Chai Bypass (CWB), Causeway Bay Typhoon Shelter (CBTS) and the developments along the north shore of Hong Kong Island.

- The construction of the CWB will take place within the CBTS between 2010 and 2016. To avoid conflict with the CWB, the alignment of the Cross Harbour Section will have to either pass above or beneath the CWB. The SCL will also have to coordinate with the CWB regarding the re-arrangement of the anchorage area and moorings in order to minimize the disruption to the community and CBTS users.
- The railway design and operational requirements (e.g. minimum turning curve and maximum gradient, provision for ventilation and emergency evacuation, etc.) will need to be taken into consideration when designing the alignment of the SCL Cross Harbour Section.
- Other constraints include geological conditions, Hung Hom Bypass fender piles, existing seawall, the freight pier in Hung Hom, harbour fairway, buoys, gas mains, CBTS breakwater and CHT portals.

17. Given the above constraints, the alignment of the SCL Cross Harbour Section will have to fall within the envelope shown in Annex 3. Some alignment options may require reclamation.

Alignment Options without Reclamation

18. Different alignment options without reclamation were studied in the preliminary design process. These include cross harbour bridge, bored tunnel and tunnel deep in rock (see Annex 4).

Cross Harbour Bridge

19. If a bridge is constructed across the Victoria Harbour, the bridge deck will have to be high enough to allow the passage of vessels. Given the permissible maximum gradient for the railway, massive approach ramps at both ends of the bridge will have to be built. However, this will require extensive resumption of private land and harbourfront area, and render it impossible for passengers at Hung Hom Station, Exhibition Station and Admiralty Station to interchange between existing and future

rail lines. The cross harbour bridge will also pose a severe visual impact on the Victoria Harbour.

Bored Tunnel in Mixed Ground

20. A bored tunnel may be constructed underneath the seabed by a tunnel boring machine (TBM). Given the constraints presented by the alignment and the geological conditions, the tunnel will have to pass through soft and rock strata, causing serious wearing of the TBM cutterhead. Frequent intervention for maintenance and repair of the cutterhead will thus be required. To prevent the influx of underground water and the collapse of the excavated surface, the cutterhead maintenance and repair work will have to be carried out under a pressure level in excess of the maximum 50 pounds per square inch as allowed by the Factories and Industrial Undertakings Ordinance. This will impose unacceptable risks to the health and lives of workers and to the project itself.

Tunnel Deep in Rock

21. A tunnel constructed deep in the rock strata can avoid the high pressure working environment. However, this will significantly lower the alignment of the Cross Harbour Section, such that the East Rail Line will need to be depressed from north of Mong Kok East Station, making the interchange at Hung Hom and Exhibition Stations unpractical or very inconvenient.

22. In short, none of the above alignment options without reclamation for the construction of the SCL Cross Harbour Section is considered reasonable.

Other Alignment Options

23. A combination of the immersed tube tunnel and cut-and-cover tunnel methods is considered viable for the construction of the SCL Cross Harbour Section. Given the constraints of the CWB Slip Road 8, the alignment options can be divided into the Easterly Alignment and the Westerly Alignment (see Annex 5). Both Alignments will require works in the CBTS, and coordination with the CWB is thus essential. The following paragraphs will outline the different alignment options within the CBTS.

Easterly Alignment

24. There are four technically feasible options for the Easterly Alignment. All of these options will follow the CWB alignment so as to share the temporary

reclamation as much as possible. Due to the overlapping of the two groups of tunnels, excavation will be much deeper than originally proposed by the CWB, and the duration for temporary reclamation will be lengthened by about 3 years. Construction complexity, risks and costs will also be increased.

25. In addition to the proposed reclamation for CWB, all of these options will require additional temporary reclamation (ranging from 0.6 to 2 hectares) at the connection between the immersed tube and cut-and-cover tunnel and Option 1D will even require additional permanent reclamation of up to 6.7 hectares at the CWB eastern portal. Cross platform interchange at Exhibition Station between the SCL and the future North Island Line will not be possible for some of these options due to alignment constraints.

Westerly Alignment

26. The Westerly Alignment, which crosses above the CWB at the west of the CBTS, is the most direct cross harbour alignment. This option will require additional temporary reclamation of approximately 2.2 hectares, which already includes the portion required for the demolition and reinstatement of the breakwater.

27. As the CWB inside the CBTS will commence soon, the CWB will construct a section of the SCL above as protection works. However, as the SCL is not yet gazetted, the extent of the SCL protection works has to confine to within the footprint of the temporary reclamation of the gazetted CWB scheme. To avoid repeated reclamation, it is suggested that the SCL protection works be further extended after the authorization of the SCL.

28. Under the Westerly Alignment option, a section of the SCL tunnels within CBTS can be constructed when CWB is also under construction.. However, owing to the alignment and working space limitations, the construction of a section of the SCL tunnels in the middle of the CBTS cannot start until the removal of all temporary reclamation under the CWB (see Annex 6). This will prolong the existence of the temporary reclamation within the CBTS by 1.5 year. On the contrary, if the construction of the Westerly Alignment and the CWB are to be completed at the same time , more moorings will have to be relocated outside CBTS. The Corporation will consult the concerned parties and refine the construction sequence in order to reach an acceptable solution.

Comparison of Alignment Options with Reclamation

29. Nevertheless, the possible coordination of the above alignment options with the CWB will depend on whether:

- Sufficient fairway and working space within the CBTS could be provided with the CWB and SCL being constructed concurrently;
- The acceptance of the revised sequence of temporary reclamation and reprovisioning of moorings by affected parties; and
- The SCL can be authorized as scheduled.

30. In short, different options of alignment will require different extent of reclamation and have different degree of disturbance to the community. While the Corporation is seeking the opinions of different parties and government departments concerned, we consider that the Westerly Alignment is a better option. A comparison of the Easterly and Westerly Alignments is shown below:

	Option 1 – Easterly Alignment				Option 2 – Westerly Alignment
	Option 1 A	Option 1B	Option 1C	Option 1D	
Permanent reclamation	Nil	To be confirmed	Nil	Additional 6.7 ha for CWB	Nil
Construction complexity and risk	High	Medium	Medium	Medium	Low
Additional temporary reclamation	0.6 ha	2 ha	2 ha	0.6 ha	2.2 ha
Extended duration of works in CBTS	+ 3 years and delay to CWB	+ 3 years and delay to CWB	+ 3 years and delay to CWB	+ 3 years and delay to CWB	+ 1.5 years
Disturbance	Prolonged occupation of moorings	Prolonged occupation of moorings	Prolonged occupation of moorings	Prolonged occupation of moorings	Limited moorings affected
Railway operation	Longer; without cross	Longer; with cross platform	Longer; without cross	Longer; without cross	Min. length; with cross

	Option 1 – Easterly Alignment				Option 2 – Westerly Alignment
	Option 1 A	Option 1B	Option 1C	Option 1D	
	platform interchange at Exhibition Station	interchange at Exhibition Station	platform interchange at Exhibition Station	platform interchange at Exhibition Station	platform interchange at Exhibition Station

31. If the Westerly Alignment is to be constructed by immersed tube and cut-and-cover method, the necessary works in Victoria Harbour and the impact associated with it will be as follows:

- Immersed tube tunnel: Since the seabed of the Victoria Harbour is undulated and the gradient requirement limits the depth of the alignment, part of the immersed tube tunnel and its cover layer will be higher than the existing seabed. However, such portions will still be lower than the top of the existing CHT and the fairway will not be affected.
- Cut-and-cover tunnel on Hung Hom sea shore (see Annex 7): About 100 metre of tunnel extending from the sea shore underneath the Hung Hom Bypass to the harbour is anticipated to be constructed by cut-and-cover method. During construction, temporary working platform on both sides of the tunnel and a temporary cofferdam will be built. This will occupy an area of about 1 ha. These will have no impact on the use of the harbour and will be demolished upon completion of the works.
- Removal and reinstatement of Hung Hom Bypass fender piles (see Annex 7): Some of the existing Hung Hom Bypass fender piles will be removed to make way for the construction of cut-and-cover tunnels and reinstated in a slightly different location and in different form. However, the area occupied by the reinstated fender piles will more or less be the same. They will continue to serve the function of protecting the Hung Hom Bypass and have no impact on the use of the harbour.

- Demolition and reinstatement of Hung Hom Freight Pier (see Annex 7): Part of the pier structure has to be demolished to make way for the trench excavation for the immersed tube tunnel. If the pier is reinstated, it will not exceed the original footprint and will have no impact on the use of the harbour.
- Demolition and reinstatement of CBTS breakwater (see Annex 8): Part of the breakwater will be removed during construction. Prior to the removal, temporary reclamation and a seawall will be provided to protect vessels in the CBTS. The breakwater will be reinstated after the completion of the tunnel construction and all the temporary reclamation will be removed. Such works will be carried out concurrently with the temporary reclamation in the CBTS. Some moorings in CBTS will be affected.
- The SCL tunnel in the CBTS (see Annex 8): The SCL tunnel in the CBTS will be constructed by the cut-and-cover method and will interface with the CWB. Both projects will require temporary reclamation in the CBTS for the construction of tunnels by cut-and-cover method. Some additional moorings in the CBTS will be affected temporarily.

Public Consultation

32. The Corporation is now conducting a series of public consultation on the SCL Cross Harbour Section, some of which have been held. The following table lists the SCL Cross Harbour Section consultation activities:

Date	Activity
16 June 2009	Professional Forum
Jul / Aug 2009	Stakeholder Briefing cum Forum
Jul / Aug 2009	Follow-up discussions after the forums
Jul - Sep 2009	Consultation with District Councils
Aug / Sep 2009	Public Forums

33. There will be three Public Forums to be held on Hong Kong Island, in Kowloon and in the New Territories to seek public's views on the SCL Cross Harbour Section, in particular the views on the following questions:

- Is there an overriding public need for SCL?
- Is there no reasonable “no reclamation” option?
- Which of the two IMT alignment corridors (easterly or westerly) is the better option?
- Should the extent of protection work in CWB be increased to avoid repeated temporary reclamation in CBTS?
- What additional work should MTRCL and Government undertake to maximize the integration of the construction work in CBTS to achieve minimum reclamation?